Pre-treatment Bone Scan Index as an Outcome Measure Predicting for Survival in Patients with Castration-Refractory Prostate Cancer

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Disclosure: Edenbrandt is Scientific Director and shareholder in EXINI diagnostics AB

BACKGROUND

- A manual method for quantification of whole-body bone scans was presented by a group at Memorial Sloan-Kettering Cancer Center, New York
- Bone Scan Index (BSI) reflects the skeletal involvement by tumor
- BSI was associated with survival in patients with prostate cancer *
- Their BSI method was manual, time-consuming, and not suitable for use in the clinical routine
- We have developed an automated method to measure BSI

* Sabbatini et al. J Clin Oncol 1999;17:948

OBJECTIVES

- To evaluate the value of BSI, calculated using an automated method, for the prediction of survival in patients with prostate cancer at the onset of chemotherapy treatment

METHODS

Whole-Body Bone Scan

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Segmentation of Skeleton

↓

Hotspot Detection

↓

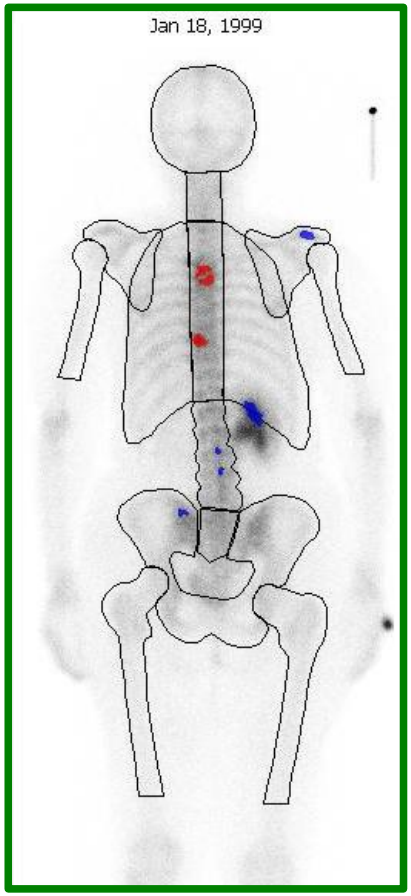
Normalization

↓

Hotspot Classification

↓

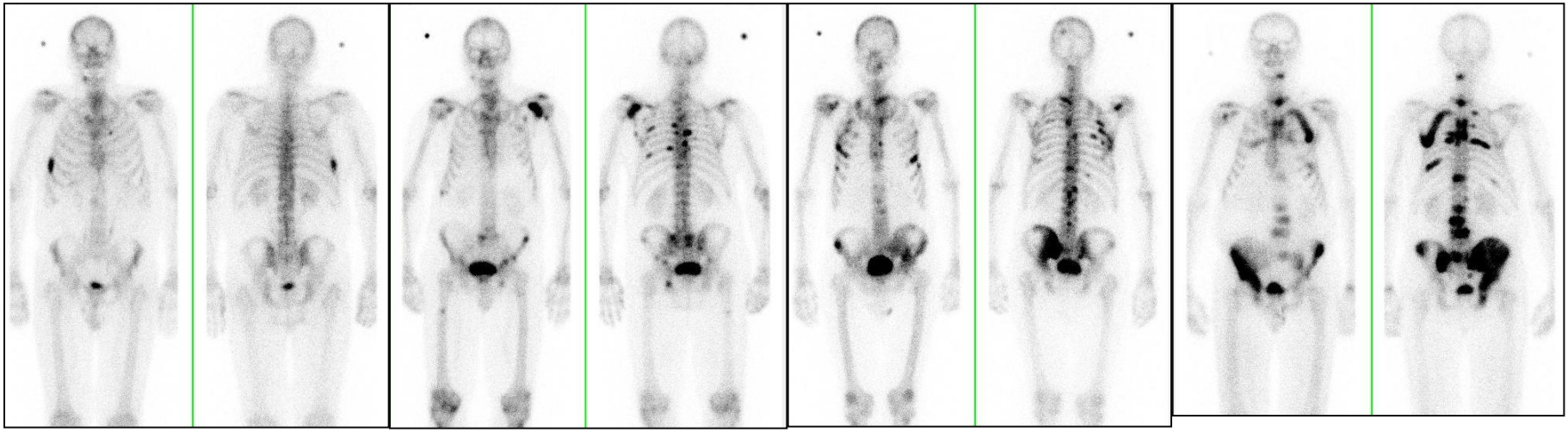
Bone Scan Index (BSI)



BSI –
total metastatic burden as a percentage of the total skeleton

METHODS

BSI 0% 1% 2% 3%



MATERIAL

- Retrospective study
- Patients with castration-refractory prostate cancer using docetaxel chemotherapy
- Digitally stored whole-body bone scans obtained in the interval 180 days before to 30 days after the onset of docetaxel treatment
- 44 patients with a mean age of 67.8 years (range 52-80years)

METHODS

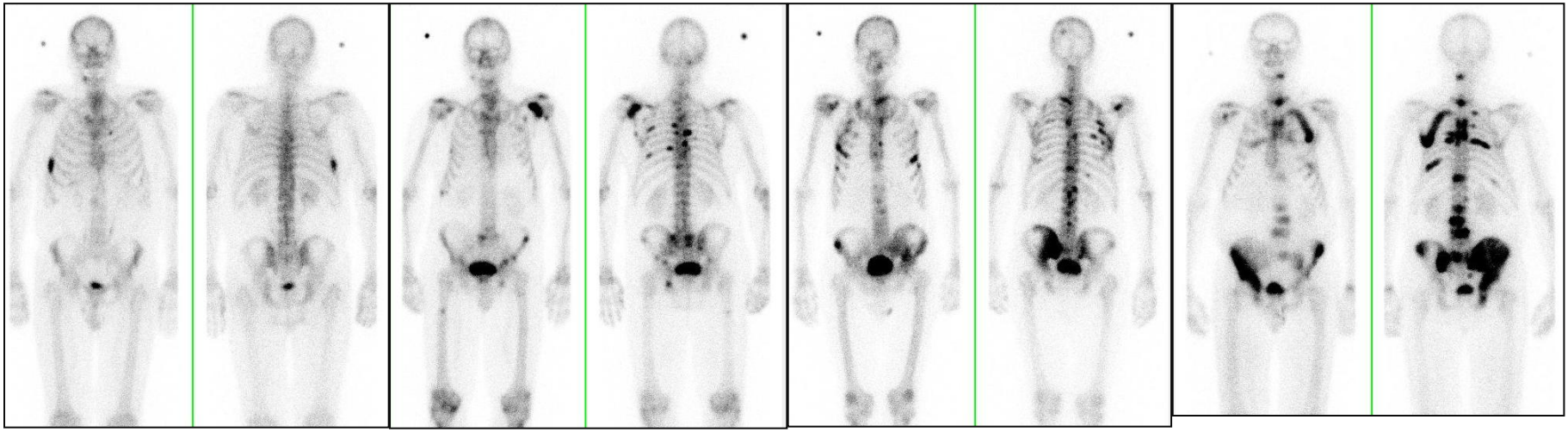
- Whole-body bone scans were obtained after injection of 600MBq Tc-99m-MDP
- BSI values were calculated using the EXINI bone™
- Survival data from the patient records
- Cox proportional hazards regression models were used to investigate the association between BSI and survival

RESULTS

- Median survival time for the 19 patients who died was 20.6 months
- Median follow-up time for the 25 patients who were still alive was 21.2 months
- BSI was significantly associated with survival (p=0.026). The hazard ratio was estimated to 1.31 (95% Confidence Interval 1.03-1.67)

RESULTS

BSI	0%	1%	2%	3%
Risk increase		31%	72%	125%



Alive	Died	Died	Died
42 months	32 months	14 months	5 months

CONCLUSION

- BSI, calculated using an automated quantitative method, appears to predict for survival in patients with castration-refractory prostate cancer at the onset of chemotherapy treatment
- BSI for quantification of whole-body bone scans might be a future method for monitoring this patient group

WORK IN PROGRESS

- Investigate the value of BSI in relation to prostate-specific antigen (PSA) for the prediction of survival in patients with prostate cancer
- Assess the value of BSI in patients with other types of cancer
- Evaluate the effect of therapy by analyzing BSI pre- and post-treatment